IC-R71A

Symptom: Radio is dead; no display, no lights. Problem may be intermittent.

Probable Causes: 1) Cracked solder joints on regulator unit. 2) Loose board mounting screw on the regulator unit that provides ground to the board. 3) Cracked solder joint(s) where power transformer mounts to regulator unit.

Cure: Remove the regulator unit from the radio and resolder all suspicious solder joints on the regulator unit. Pay particular attention to the solder joints at heat sink-mounted transistor Q1 on the regulator unit. Modification: After tightening the regulator unit to the chassis, at the chrome screw with the spacer, apply a solder bridge across the spacer to form a solid electrical connection between the board and the chassis. This will prevent future failures due to bad connections at this joint.

Remarks: The power supply on the R-71A receiver runs very hot, and problems with the regulator unit are common. We recommend inspecting and servicing (if needed) the regulator unit in all R-71A receivers that are in need of repairs.

Symptom: AC hum in audio; radio may seem to vibrate during operation; pilot lamp may be dim. Inspection reveals excessive AC ripple on 13.8 line in radio.

Probable Causes: Bad bridge rectifier D1 on regulator unit.

Cure: Replace bad D1 bridge rectifier (KBPC102). Service regulator as per previous cure.

Symptom: AC hum in audio after CR-64 crystal oscillator is installed.

Probable Causes: The oven in the CR-64 crystal oscillator is drawing more current than the reg. unit can handle.

Cure: Service the power supply as listed above. On older production units, check resistor R2 on the reg. unit. If it is 100 ohms, replace it with a 56 ohm, 5 watt. Adjust the reg. unit output voltage to 13.6 volts.

Symptom: No audio. S-meter fully deflected.

Probable Causes: -10 volt DC-DC converter failure.

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Cure: Replace faulty DP-2 module (IC-6) on the matrix unit.

Symptom: Frequency display blanks out periodically with only decimal points remaining.

Probable Cause: Display DC-DC converter has noisy output.

Cure: Replace all of the following dried-out electrolytic capacitors on the display unit: C15, C16, C17, C18, C19, C20, C21 and C22. These capacitors are bright yellow when new. If they have turned brown, they are old and dried out.

Remarks: While servicing the DC-DC converter section examine the board closely for cracked solder joints as this section of the radio runs hot. Also, we recommend reprogramming the RAM card after servicing the DC-DC section.

Symptom: Erratic display i.e., frequency listed will be out of the normal operating range of the radio. Rotating the VFO knob may cause strange characters to appear in the display. Cycling the power switch a few times may restore operations temporarily.

Probable Causes: 1) Cracked solder connections on RAM unit is causing logic errors. 2) Program in RAM unit is corrupt.

Cure: Resolder cracked joints at J1 and J2 connectors on RAM unit, then reprogram. If this does not help, substitute RAM unit with a known good one. If the substitute RAM unit works properly, then the RAM unit must be replaced. If the substitute RAM unit does not cure the problem, there may be noise from the DC-DC converter causing the logic unit to glitch. Follow instructions for the previous problem.

Symptom: Noisy RX on most bands. Noise seems to be internally generated and is present whether or not an antenna is connected.

Probable Causes: Dried out capacitors C128, C129, C130 and C137 on PLL unit are causing the 5 and 8 volt regulators to oscillate.

Cure: Replace capacitors. Most of these capacitors are light blue when new. If they have turned brown or gray, they are old and dried out.

Symptom: Garbled SSB audio on one or more bands. Audio may cut out altogether. Some bands may sound

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OK. Problem may be temperature related.

Probable Cause: Bad trimmer capacitors on PLL unit, HPL VCO section.

Cure: Replace plastic trimmer capacitors C78, C88, C97, and C107 with ceramic equivalents. Remove excessive wax from around replacement trimmers to prevent wax contamination. We suggest using a 12 pF trimmer capacitor for C97 instead of a 6 pF as listed in the service manual. This will allow you to properly adjust the HPL lock voltage for that band.

Remarks: While you have the PLL unit lifted, rework cracked solder around the regulator section and at the two ground springs.

Symptom: Very low sensitivity on all bands.

Probable Causes: 1) Open RF fuse F1 located at antenna jack. 2) Bad FETs on RF unit, probably caused by an RF overload through the antenna jack.

Cure: Check for open fuse. Replace Q3 & Q4 mixer FETs on RF unit.

Remarks: If there is 6 volts present at the center conductor of the antenna jack, unit has taken an RF overload. See next problem.

Symptom: Marginal sensitivity, or sensitivity is reduced when coax shield is connected to the antenna jack. Inspection reveals 6 (or 9) volts DC at center if the antenna jack.

Probable Cause: RF overload through the antenna jack has shorted capacitors on RF unit.

Cure: Replace shorted C1 capacitor (0.047 µF, 16v) on RF unit. Also check C7 and C11 capacitors for shorts.

Remarks: For future reliability, you may wish to replace a leaky C1 capacitor with a 50-volt version.

Symptom: Buzz in audio. Buzz can be heard in speaker or headphones even with volume control set to minimum.

Probable Cause: Audio cables are too close to the AC wires.

Cure: Reroute AC wires and audio cables away from each other behind front panel in power switch area.

Symptom: CPU noise in audio. Noise may be louder on some bands than others.

Probable Causes: 1) Poor ground on display unit. 2) Inadequate shielding for RF unit.

Cure: Make sure that audio cables and RF unit control lines are not routed next to CPU control and display data lines. Try tightening the two screws beneath the display unit PCB. If neither of these help, install a plastic coated metal shield over the display unit. This type of shield is available through our parts department.

Symptom: Loud, high pitched squeal emanates from inside radio.

Probable Cause: DC-DC converter transformer has a loose core.

Cure: Replace T1 transformer (TO-9) on the display unit.

Symptom: VFO tuning is erratic, sometimes skips when changing bands. Sometimes least-significant digit in display doesn't increment smoothly when VFO knob is turned slowly.

Probable Cause: Dirty rotary encoder.

Cure: Remove white plastic cover from back of rotary encoder and spray-clean the carbon track with Blue Shower solvent. Spin VFO knob vigorously while spraying.

Remarks: Do not let solvent saturate the display unit or allow it to come into contact with the plastic display lens. Stuff a paper towel between the rotary and display unit to catch spray run-off.

Symptom: No RX through ANT 1 (LBA) jack.

Probable Cause: Open fuse DS2 on RF unit.

Cure: Replace open fuse.

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IC-745

Symptom: Distorted RX/TX, or no RX/TX on one or more bands. Distorted SSB audio; sounds raspy and rough. Problem may be temperature related.

Probable Cause: Bad trimmer capacitors on PLL unit, HPL VCO section.

Cure: Replace plastic trimmer capacitors C78, C88, C96, and C107 with ceramic equivalents. We suggest using a 12 pf trimmer capacitor for C96 instead of a 7 pf as listed in the service manual. This will allow you to properly adjust the HPL lock voltage for that band.

Remarks: While you have the PLL unit lifted, it would be a good idea to inspect and rework the soldering in the regulator section. Also, inspect electrolytic capacitors C128, C129, C132, and C137 in the regulator circuit for discoloration caused by overheating. Replace all overheated capacitors to prevent future failures.

Symptom: Frequency instability.

Probable Causes: 1) Unstable trimmer capacitor C5 on 2nd L.O. unit. 2) Dirty RIT/XIT pot and switches.

Cure: Replace plastic trimmer capacitor with a 30 pf ceramic trimmer and realign. Clean dirty RIT/XIT pots and switches with Blue Showers solvent.

Remarks: Unstable C5 capacitor is very common in the IC-745. The plastic version of this capacitor should be replaced on all units that are in need of repair as preventative maintenance.

Symptom: Erratic display i.e., frequency listed will be out of the normal operating range of the radio. Rotating the VFO knob may cause strange characters to appear in the display. Radio does not work properly. Cycling the power switch a few times may restore operation temporarily. Problem may be temperature related.

Probable Causes: 1) Cracked solder connections on RAM unit is causing logic errors. 2) Program in RAM unit is corrupted. 3) Burned/overheated R20 resistor on logic unit is causing low voltage in logic unit.

Cure:

Check for burned R20 resistor (10 ohm, 1/2 watt) on logic unit. If it looks OK, resolder cracked solder joints at J1 and J2 connectors on RAM unit, then reprogram. If this does not help, substitute RAM unit with a known good one. If

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the substitute RAM unit works properly, then the RAM unit must be replaced.

Symptom: RX noisy and intermittent. Preamp intermittent.

Probable Causes: 1) Bad preamp relay on RF unit. 2) Cracked solder on RF unit in preamp section.

Cure: Replace bad relay RL1 (FBR221DO12). Carefully examine the preamp section of the RF unit for bad joints and resolder as needed.

Symptom: Intermittent low FM TX output power.

Probable Cause: Poor contacts in relay RL1 on FM unit.

Cure: Replace bad RL1 relay (221B-D009-M).

Symptom: No preamp operation. Sensitivity of radio drops when preamp is engaged.

Probable Causes: 1) Bad preamp relay on RF unit. 2) Burned components in preamp section on RF unit.

Cure: Replace bad RL1 relay (FBR221DO12). Replace bad/burned preamp components on RF unit, usually RL1 relay, Q11, Q12 transistors, R58 resistor, C86 capacitor, etc... Also check Q10 transistor for failure. If bad, replace it with a 2SC2878B.

Symptom: Low, erratic TX output in all modes. ALC meter reading is unsteady and may drop out altogether. Removing the top cover may cause problem to disappear for a while. Pressing on the wiring harness near the IF unit may cause the power/ALC meter reading to fluctuate. Problem may be temperature related.

Probable Causes: 1) Cracked solder joints on IF unit. 2) Dirty RF power/mic gain pot. 3) Poor connections at IF unit is causing low TX drive. This is sometimes caused by oxidation at the point where the wires are crimped to the connector pins. 4) Bad relay on FM unit (if installed).

Cure: Clean dirty RF power/mic gain pot. Resolder cracked and suspicious looking solder joints on IF unit. If these do not help, remove and resolder the wire crimps in the RF connector pins in J2, J5, J12, J9, J19 and J20 connectors on the IF unit. Be sure to not add too much solder to the connector pins or they will need to be replaced. Be sure all connectors are fully seated after repair. Replace RL1 relay on the FM unit.

Remarks: Although resoldering the connector pins is a

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delicate and time consuming procedure, it will save you a great deal of troubleshooting time and frustration.

Symptom: TX power marginal on some bands. ALC meter reading is low but steady, not erratic. Cannot use ALC to adjust for more power. Troubleshooting reveals that no specific stage is malfunctioning

Probable Causes: 1) TX IF needs to be aligned. 2) Modification to IF unit needs to be removed.

Cure: Set unit to 14.100 MHz, TX in RTTY mode, and adjust L8, L10 and L11 coils on IF unit for peak ALC meter reading. If this does not yield enough drive, remove the 220-ohm resistor on the bottom side of the IF unit directly beneath L8 coil and retune. Be sure to readjust power, ALC level and metering, if needed.

Remarks: If the above steps have no effect, troubleshoot for a defective TX stage, or follow steps for curing erratic TX.

Symptom: VFO tuning is erratic, sometimes skips when changing frequencies or bands. Displayed frequency does not increment smoothly when VFO knob is turned slowly.

Probable Cause: Dirty rotary encoder.

Cure: Remove white plastic cover from back of rotary encoder and spray clean the carbon track with Blue Shower solvent. Spin VFO knob vigorously while spraying.

Remarks: Do not let solvent saturate the display unit or allow it to come into contact with the plastic display lens. Stuff a paper towel between the rotary encoder and display unit to catch spray run-off.

Symptom: TX power gradually drops off when warm. ALC meter indication remains at mid-scale. Adjusting ALC does not help.

Probable Cause: APC misalignment.

Cure: Realign ALC, Ic METER, and APC as per pages 9-1 and 9-2 in the service manual.

Symptom: AC hum or buzz in transmit and receive audio when an internal power supply is installed.

Probable Cause: AC in being induced into the PLL from the AC wires and power supply case.

Cure: Twist the AC wires that run from the rear panel to the power switch and route them away from the PLL unit. Tape them up against the chassis if necessary. Remarks: In some radios, especially older IC-745s, it is not possible to completely eliminate all AC hum when using the internal power supply.

Symptom: Drastic change in audio frequency response between USB and LSB., i.e. USB audio has too much bass while LSB audio has too much treble. TX frequency response is also poor.

Probable Causes: Misadjustment of the BFO or PBT oscillator.

Cure: Align the BFO and PBT oscillator as per page 9-4 of the service manual.

Symptom: Distorted/raspy-sounding SSB TX. Complaints of RFI. Unit tests fine on dummy load. Unit is being used with an external 3rd party power supply.

Probable Causes: 1) Inadequate station ground. 2) External 3rd party power supply needs additional RF decoupling.

Cure: Recheck station ground. Improve if necessary. Install additional RF decoupling capacitors on the DC terminals of the power supply.

Symptom: Noise in RX, birdies.

Probable Cause: Voltage regulators on PLL unit are oscillating.

Cure: Replace overheated C128, C129, C132 and C137 regulator filter capacitors on PLL unit.

Symptom: No receive through LB antenna jack. No BC band RX.

Probable Cause: Open DS1 fuse on RF unit.

Cure: Replace open fuse.

Symptom: 1) No RX/TX at all. Display normal. 2) No CW operation, or, 3) Some front panel controls do not operate reliably.

Probable Cause: Burned or open R1 resistor on reg. unit.

Cure: Replace R1 resistor (4.7 ohm, 1/2 watt).

Symptom: TX oscillations/spurious output.

Probable Causes: 1) Bad Q10 transistor on RF unit. 2) Open parasitic-suppression resistor on PA unit. 3) Bad electrolytic filter capacitors on PA unit. 4) Bad

drivers or finals.

Cure: Disconnect J9 connector on the RF unit and see if the problem goes away. If it does, then Q10 transistor is most likely bad (replace it with a 2SC2878B). If disconnecting J9 connector has no effect, check the value of R22 resistor (4.7 ohms) on PA unit. This resistor may look OK but still be open. Replace C18 and/or C25 capacitors if they appear swollen or overheated. If none of the above are causing the problem and ALC meter deflection is low, then most likely the drivers or PA transistors are bad.

Remarks: Spurious output may also be caused by incorrect band switch voltage to the low-pass filter unit, or even faulty/burned components on the filter unit itself. The above causes should be ruled out first, since low-pass filter failures are not common in the IC-745.

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